Please provide the following information, and submit to the NOAA DM Plan Repository.

Reference to Master DM Plan (if applicable)

As stated in Section IV, Requirement 1.3, DM Plans may be hierarchical. If this DM Plan inherits provisions from a higher-level DM Plan already submitted to the Repository, then this more-specific Plan only needs to provide information that differs from what was provided in the Master DM Plan.

URL of higher-level DM Plan (if any) as submitted to DM Plan Repository:

1. General Description of Data to be Managed

1.1. Name of the Data, data collection Project, or data-producing Program:
C-CAP Lanai, Hawaii 2005-2011 Land Cover Change Analysis

1.2. Summary description of the data:
This data set contains the 2005 and 2011 classifications of Lanai and can be used to analyze change. This data set utilized utilized 14 full or partial WorldView2 multispectral scenes and the 2005 high-resolution Lanai C-CAP data set, which were analyzed according to the Coastal Change Analysis Program (C-CAP) protocol to determine land cover.

1.3. Is this a one-time data collection, or an ongoing series of measurements?
One-time data collection

1.4. Actual or planned temporal coverage of the data:
2005-02-20 to 2011-01-22

1.5. Actual or planned geographic coverage of the data:
W: -157.040164, E: -156.475634, N: 20.560455, S: 20.433185

1.6. Type(s) of data:
(e.g., digital numeric data, imagery, photographs, video, audio, database, tabular data, etc.)
Map (digital)

1.7. Data collection method(s):
(e.g., satellite, airplane, unmanned aerial system, radar, weather station, moored buoy, research vessel, autonomous underwater vehicle, animal tagging, manual surveys, enforcement activities, numerical model, etc.)

1.8. If data are from a NOAA Observing System of Record, indicate name of system:

1.8.1. If data are from another observing system, please specify:

2. Point of Contact for this Data Management Plan (author or maintainer)

2.1. Name:
NOAA Office for Coastal Management (NOAA/OCM)

2.2. Title:
Metadata Contact

2.3. Affiliation or facility:
NOAA Office for Coastal Management (NOAA/OCM)

2.4. E-mail address:
coastal.info@noaa.gov

2.5. Phone number:
(843) 740-1202

3. Responsible Party for Data Management
Program Managers, or their designee, shall be responsible for assuring the proper management of the data produced by their Program. Please indicate the responsible party below.

3.1. Name:

3.2. Title:
Data Steward

4. Resources
Programs must identify resources within their own budget for managing the data they produce.

4.1. Have resources for management of these data been identified?

4.2. Approximate percentage of the budget for these data devoted to data management (specify percentage or "unknown"):

5. Data Lineage and Quality
NOAA has issued Information Quality Guidelines for ensuring and maximizing the quality, objectivity, utility, and integrity of information which it disseminates.

5.1. Processing workflow of the data from collection or acquisition to making it publicly accessible
(describe or provide URL of description):
Process Steps:
- 2013-05-01 00:00:00 - Process_Description This dataset, and the 2011-era classification was created by Photo Science. The 2005-era C-CAP classification was created by Sanborn. This dataset contains the classifications of 2005 imagery and 2011 imagery. It is used for change analysis between these years. The attributes

include a from-to change description category. There are 521 classes corresponding to the 521 possible from-to change combinations. In this section of the metadata, the 2005 classification procedure is described, then the 2011 change detection classification procedure is described. Finally in the post-processing section, the process of combining the maps to generate a spatial matrix of change is discussed. Early Date (2005) Classification: This section outlines the classification procedure for the Lanai High Resolution C-CAP. Quickbird imagery used in producing this land cover product was also utilized in producing an associated impervious surfaces layer for the island. The mapping approach utilized a boundary summary and refinement procedure developed by Sanborn to leverage previous moderate resolution C-CAP mapping efforts to create the high resolution land cover data set. A calibration visit was conducted and training data was collected for classification. Non impervious features were mapped using a 0.5 acre minimum mapping unit (MMU). Pre-processing steps: The Quickbird mosaic utilized for this project was provided from Digital Globe as an orthorectifed, georeferenced product and was consistent with the quoted 1:12000 spatial accuracy. In conjunction with the Quickbird mosaic, Sanborn used an ancillary Quickbird mosaic, as well as a DTM created from a 5m radar collect for the island. The original return image from the radar was also utilized. Field-Collected Data: Training data was collected between January 24, 2009 and January 28, 2009. Land cover observations were recorded by analysts. The referenced dataset went through a QA/QC procedure to ensure it met accuracy standards. Classification: Initial Segmentation - Image segmentation was completed at multiple scales using the multispectral (2.4 m) imagery in order to group like spectral and textural objects within the imagery. The initial segments were created at a larger scale (scale refers to the target size and shape of like features generalized by Definens software) of 100. Larger segments are required to leverage the 30 m data sets and incorporate the IFSAR data that is collected at spatial resolution of 5 m. For consistency, the associated impervious data set was incorporated into the segmentation layer as a boundary delimiter. Segments can share boundaries of an impervious surface, but can never overlap an impervious surface.

- 2013-05-01 00:00:00 - Rule set Creation - The initial map of the island of Lanai is created by incorporating an existing C-CAP 2001 land cover data set through a logical rule set created by a Sanborn analyst. The rules are created such that image segments are labeled to the C-CAP classification scheme based on their underlying medium resolution components. Initial Label and Edits - The automated labeling procedure created a reasonable representation of land cover using the labeling routine, however errors did occur. Gross inaccuracies in the data product that would inhibit the further classification of the segments at a smaller scale factor were corrected through knowledge based models or manual edits. Secondary Segmentation - Further refinement of the map is only possible though classification of the image segments directly. Classification of the image segments is a hierarchical process, whereby larger scale segments are composed of smaller scale segments. The initial segmentation was used to further aid in the automated

classification of the secondary (more detailed) image segments. The final scale factor for the mosaic was 35. Automated Classification - Automated classification of the image segments is accomplished through a process modeling incorporated within Definiens software. Models are built to refine or reclassify land cover areas by utilizing the wealth of attribute information linked to each segment within Definiens. In a small amount of cases, the nearest neighbor classification routine was used to refine segments. Nearest neighbor training data is collected through analyst interpretation or ancillary data sets and used to calibrate the classification algorithm. Automated Classification Edits - As with any automated or semi-automated land cover classification there are often inconsistencies in the land cover map. The final step before map finalization was to remove inaccuracies through manual segment labeling as interpreted by an analyst. Map Finalization - Sanborn used independent reviewer's comments to further refine the land cover map. Attributes for this product are as follows: 0 Background 1 Unclassified 2 Impervious 3 4 5 Developed, Open Space 6 Cultivated Crops 7 Pasture/Hay 8 Grassland/Herbaceous 9 Deciduous Forest 10 Evergreen Forest 11 Mixed Forest 12 Scrub/Shrub 13 Palustrine Forested Wetland 14 Palustrine Scrub/Shrub Wetland 15 Palustrine Emergent Wetland 16 Estuarine Forested Wetland 17 Estuarine Scrub/ Shrub Wetland 18 Estuarine Emergent Wetland 19 Unconsolidated Shore 20 Bare Land 21 Open Water 22 Palustrine Aquatic Bed 23 Estuarine Aquatic Bed 24 Tundra 25 Snow/Ice Late Date (2011) Classification: This section outlines the classification procedure for the Lanai High Resolution C-CAP. WorldView2 imagery used in producing this land cover product was also utilized in producing an associated impervious surfaces layer for the island. The mapping approach utilized a boundary summary, outlier change detection process and refinement procedure developed by Photo Science to leverage the 2005 high resolution C-CAP data set to create the 2011 high resolution C-CAP. A calibration visit was not conducted though NOAA had access to local resources for validation. Non impervious features were mapped using a 0.25 acre minimum mapping unit (MMU) and impervious features were mapped using a 0.1 acre MMU.

- 2013-05-01 00:00:00 - Pre-processing steps: The WorldView2 mosaic utilized for this project was provided from Digital Globe as an orthorectified, georeferenced product. Multiple image primitives and indicies such as texture and NDVI were derived from the 8-band satellite data. The imagery was re-sampled from it's native 2m spatial resolution to 2.4m. The 2005 C-CAP classification and the base Quickbird imagery (used in the original mapping) were geometrically corrected to co-register to the WorldView2 data which has a higher geolocation accuracy. Impervious Update: The 2005 impervious was over-laid with semi-transparency on the 2011 satellite data. It was panned at a scale of 1:3,500 and manually updated to match the 2011 data. Analysts zoomed in to a larger scale when necessary to perform edits. The product went through a QC procedure to ensure features were accurately captured. Segmentation and Outlier Detection Process: The 2011 impervious was combined with the 2005 land cover to create a hybrid data set. Image segmentation, done in Trimble's eCognition software, was completed at multiple scales using the

multispectral (2.4 m) imagery in order to group like spectral and textural objects within the imagery. For consistency, the associated hybrid data set was incorporated into the segmentation layer as a boundary delimiter. Segments contained image attributes and a label from the 2005 classification. These data were inputs to a custom multi-variate outlier detection tool that identified objects of potential change. These areas created the change mask. Training Site Data: Training data was photo interpreted and collected within the change mask and was super-sampled from features outside of the mask. The referenced data set went through a QA/QC procedure to ensure it met accuracy standards. Classification: Automated Classification - Image segments were classified using a decision tree classifier in Rulequest's See5 software based on the training data and image attributes. Automated Classification Refinement - Models are built to refine or reclassify land cover areas by utilizing the wealth of attribute information linked to each segment within eCognition. Classification Edits - As with any automated or semi-automated land cover classification there are often inconsistencies in the land cover map. The final step before map finalization was to remove inaccuracies through manual segment labeling as interpreted by an analyst. Map Finalization - Photo Science used independent reviewer's comments to further refine the land cover map. Attributes for this product are as follows: 0 Background 1 Unclassified 2 Impervious 3 4 5 Developed, Open Space 6 Cultivated Crops 7 Pasture/Hay 8 Grassland/ Herbaceous 9 Deciduous Forest 10 Evergreen Forest 11 Mixed Forest 12 Scrub/ Shrub 13 Palustrine Forested Wetland 14 Palustrine Scrub/Shrub Wetland 15 Palustrine Emergent Wetland 16 Estuarine Forested Wetland 17 Estuarine Scrub/ Shrub Wetland 18 Estuarine Emergent Wetland 19 Unconsolidated Shore 20 Bare Land 21 Open Water 22 Palustrine Acquatic Bed Post-Processing Steps: A GIS matrix algorithm was run with 2005 and 2011 datasets as inputs. The algorithm generates a from-to file where each combination is uniquely labeled from 1 to 625.
- 2013-07-24 00:00:00 - Metadata imported

5.1.1. If data at different stages of the workflow, or products derived from these data, are subject to a separate data management plan, provide reference to other plan:

5.2. Quality control procedures employed (describe or provide URL of description):

6. Data Documentation
The EDMC Data Documentation Procedural Directive requires that NOAA data be well documented, specifies the use of ISO 19115 and related standards for documentation of new data, and provides links to resources and tools for metadata creation and validation.

6.1. Does metadata comply with EDMC Data Documentation directive?
No

6.1.1. If metadata are non-existent or non-compliant, please explain:

Missing/invalid information:
- 1.7. Data collection method(s)
- 3.1. Responsible Party for Data Management
- 4.1. Have resources for management of these data been identified?
- 4.2. Approximate percentage of the budget for these data devoted to data management
- 5.2. Quality control procedures employed
- 7.1. Do these data comply with the Data Access directive?
- 7.1.1. If data are not available or has limitations, has a Waiver been filed?
- 7.1.2. If there are limitations to data access, describe how data are protected
- 7.3. Data access methods or services offered
- 7.4. Approximate delay between data collection and dissemination
- 8.1. Actual or planned long-term data archive location
- 8.3. Approximate delay between data collection and submission to an archive facility
- 8.4. How will the data be protected from accidental or malicious modification or deletion prior to receipt by the archive?

6.2. Name of organization or facility providing metadata hosting:
NMFS Office of Science and Technology

6.2.1. If service is needed for metadata hosting, please indicate:

6.3. URL of metadata folder or data catalog, if known:
https://www.fisheries.noaa.gov/inport/item/48347

6.4. Process for producing and maintaining metadata
(describe or provide URL of description):
Metadata produced and maintained in accordance with the NOAA Data Documentation Procedural Directive: https://nosc.noaa.gov/EDMC/DAARWG/docs/EDMC_PD-Data_Documentation_v1.pdf

7. Data Access
NAO 212-15 states that access to environmental data may only be restricted when distribution is explicitly limited by law, regulation, policy (such as those applicable to personally identifiable information or protected critical infrastructure information or proprietary trade information) or by security requirements. The EDMC Data Access Procedural Directive contains specific guidance, recommends the use of open-standard, interoperable, non-proprietary web services, provides information about resources and tools to enable data access, and includes a Waiver to be submitted to justify any approach other than full, unrestricted public access.

7.1. Do these data comply with the Data Access directive?

7.1.1. If the data are not to be made available to the public at all, or with limitations, has a Waiver (Appendix A of Data Access directive) been filed?

7.1.2. If there are limitations to public data access, describe how data are protected from unauthorized access or disclosure:

7.2. Name of organization of facility providing data access:
NOAA Office for Coastal Management (NOAA/OCM)

7.2.1. If data hosting service is needed, please indicate:

7.2.2. URL of data access service, if known:

7.3. Data access methods or services offered:

7.4. Approximate delay between data collection and dissemination:

7.4.1. If delay is longer than latency of automated processing, indicate under what authority data access is delayed:

8. Data Preservation and Protection
The NOAA Procedure for Scientific Records Appraisal and Archive Approval describes how to identify, appraise and decide what scientific records are to be preserved in a NOAA archive.

8.1. Actual or planned long-term data archive location:
(Specify NCEI-MD, NCEI-CO, NCEI-NC, NCEI-MS, World Data Center (WDC) facility, Other, To Be Determined, Unable to Archive, or No Archiving Intended)

8.1.1. If World Data Center or Other, specify:

8.1.2. If To Be Determined, Unable to Archive or No Archiving Intended, explain:

8.2. Data storage facility prior to being sent to an archive facility (if any):
Office for Coastal Management - Charleston, SC

8.3. Approximate delay between data collection and submission to an archive facility:

8.4. How will the data be protected from accidental or malicious modification or deletion prior to receipt by the archive?
Discuss data back-up, disaster recovery/contingency planning, and off-site data storage relevant to the data collection

9. Additional Line Office or Staff Office Questions

Line and Staff Offices may extend this template by inserting additional questions in this section.